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Interim Terrain Data (ITD) and Vector Product Interim Terrain Data (VITD) User's Guide

William H. Ryder

September 1996

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The Interim Terrain Data (ITD)/Vector Product Interim Terrain Data(VITD) User's Guide is intended to be a convenient reference for users of these types of terrain analysis data. ITD is a digitized version of the standard 1:50,000-scale Tactical Terrain Analysis Data Base(TTADB) product produced by the Defense Mapping Agency (DMA). Like TTADB, ITD is comprised of six thematic layers of spatial and feature data. These include Obstacles, Surface Drainage, Transportation, Surface Materials (soils), Surface Configuration (slope) and Vegetation. ITD is distributed on 9-track tape in the Standard Linear Format(SLF) using the DMA Feature File(DMAFF) coding scheme. DMA has moved to Vector Product Format(VPF) and the Feature Attribute Coding Catalog(FACC) as its standards for distributing Vector-based products. VPF is a data structure format. FACC is a hierarchically based feature and attribute-naming convention. The newer version of ITD in VPF/FACC is VITD. These and other topics are in this User's Guide. Specifically, coding schemes, data structure, file organization, and applications using the data, such as tactical decision aids(TDA), are included. Appendices include glossaries for features and attributes, and feature/attribute tables.

14. SUBJECT TERMS
Interim Terrain Data(ITD), Standard Linear Format(SLF)
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PREFACE

This work was performed during the period July 1995 to September 1996 under the supervision of Mr. Jeffrey A. Messmore, Chief, Special Studies Division; and Mr. Regis J. Orsinger, Director, Digital Concepts and Analysis Center.

The final review, editing, and preparation of this User's Guide for publication was performed during the period November to December 1996 with the help of Mr. Donald J. Morgan, Acting Chief, Special Studies Division; and Messrs. Louis A. Fatale and Clifford Jordan.

COL Robert F. Kirby was the Acting Director and Commander of the U.S. Army Topographic Engineering Center at the time of publication of this report.

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INTERIM TERRAIN DATA (ITD) AND VECTOR PRODUCT INTERIM TERRAIN DATA (VITD) USER'S GUIDE

INTRODUCTION

Purpose. The purpose of this guide is to give the user a clear, concise manual describing ITD and VITD and some of their uses. This guide does not cover all aspects of ITD/VITD, nor does it replace the military specification. It will help the user better understand and apply ITD/VITD. Glossaries and tables have been included in the appendices for convenient reference.

Other documents that the user may want to reference include:

1. MIL-PRF-89014A. *Performance Specification Interim Terrain Data (ITD)/Planning Interim Terrain Data (PITD).* 15 August 1995.

2. DPS-SLF-A. *Digital Production System Standard Linear Format (SLF) for Digital Cartographic Feature Data.* September 1993.

3. MIL-PRF-89040A. *Performance Specification - Vector Product Interim Terrain Data (VITD).* 8 May 1996.

4. MIL-STD-2407. *Military Standard - Vector Product Format.* 30 September 1993.

5. *Digital Geographic Information Exchange Standard (DIGEST) Part Four - Feature Attribute Coding Catalog (FACC).* Edition 1.2, January 1994.

ITD. ITD is the first generation of digital terrain analysis data. ITD is simply a digital version of the standard 1:50,000-scale Tactical Terrain Analysis Data Base (TTADB). Like the TTADB, six thematic layers comprise ITD (Figure 1).

Obstacles	Surface Configuration (slope)
Surface Drainage	Surface Materials (soils)
Transportation	Vegetation

Figure 1. Coverages (Layers) Included in ITD

ITD was developed in the late 1980 time frame to meet the armed services short to mid-term requirements for digital terrain analysis data. ITD was generated using Standard Linear Format (SLF), and using WGS84 as the horizontal datum. It is distributed on nine-track magnetic tape.

VITD. Since ITD was first developed, the Defense Mapping Agency (DMA) has adopted Vector Product Format (VPF) as its digital standard. The VPF version of ITD is termed VITD. Like ITD, VITD uses WGS84 as its horizontal datum. DMA will distribute VITD on CD-ROM.

DIFFERENCES BETWEEN ITD AND VITD

Though ITD and VITD are very similar, there are some notable differences.

Format. The major difference between ITD and VITD is the data format. ITD is in SLF, and VITD uses VPF. The two formats are discussed further in the "Digital Formats" section of this guide.

Coding Schemes. The feature and attribute codes for ITD use the DMA Feature File (DMAFF) coding scheme. In contrast, VITD features and attributes use the Feature Attribute Coding Catalog (FACC) scheme developed by the Digital Geographic Information Working Group (DGIWG) to support the Digital Geographic Information Exchange Standard (DIGEST). Though basically the same, ITD DMAFF feature codes begin with a numeral while VITD FACC codes begin with a letter. Feature names and attribute codes are not necessarily coincident between the two data sets. These differences are identified in Appendices B and C respectively.

Surface Roughness Qualifier (SRQ) vs. Surface Roughness Description (SRD). The ITD surface materials theme contains the attribute SRQ. This attribute describes the conditions of the surface, and only three values are assigned (0 = Unknown; 1 = No surface roughness effect; and 2 = Area of high landslide potential). Attribute values 3 through 98 are left open for assignment based on the needs of the individual project. For VITD, the attribute is known as the SRD, and there are 61 values/descriptions in a comprehensive list used for all projects. This information can be found in Appendices D and E respectively.

General Roughness (GR) Category. The GR Category is used in ITD to report an estimate of the effect of surface roughness upon the ability of a vehicle or person to move across an area. When ITD was developed, DMA and the U. S. Army utilized DMA's Cross-Country Mobility (CCM) Model to predict the effects of terrain on mobility. The GR Category was an important factor in the calculations made in this model. Over time, U. S. Army Waterways Experiment Station (WES) mobility models have replaced the CCM model, and the GR attribute is no longer used. Consequently, the GR Category is not found in VITD. For more information about CCM, refer to the "Applications of ITD/VITD" section of this guide. For more information on the GR Category, see Appendix A.

DIGITAL FORMATS

ITD

Structure. ITD uses SLF as its data format. SLF is two overlaying data structures, spatial and cartographic. The spatial structure associates cartographic features with their exact geometric placement. The cartographic structure which acts as the link between the spatial structure and the real world attributes, is represented by three basic map features, points, lines and areas. Each cartographic feature contains an attribute list and pointers to the chain-node structure(s) representing the spatial description of the feature. The chain-node structure requires that a segment be stored only once, despite the number of features it is a part of. The chain-node structure eliminates double storage of common boundaries, simplifies upgrades and corrections, and responds to thinning and generalization algorithms.

File Organization. ITD is produced as a set of six thematic files, duplicating the content of the TTADB overlays. Each ITD file or data set is made up of several records:

1. HDR - Header record.

2. DSI - Data set identifier. Contains common descriptive information for the entire data set.

3. SEG - Segment record. Contains the coordinate strings for the segments that make up the features.

4. FEA - Feature record. Contains identifying and descriptive information for each feature in the data set. It also contains a list of keys to the segments that make up the features.

5. TXT - Text record. Optional, contains free-format textual information regarding the data set and/or particular features within it.

Feature File Coding. In ITD, the feature codes and the attributes are stored in related feature files. These files are linked to the data sets through the feature ID. All feature codes and attributes are based on the DMAFF. The DMAFF codes are stored in the feature record, each record containing a feature block count and a feature header (40 bytes). For ITD, this record has seven blocks containing 280 bytes.

Feature File Attribute Entries. Each feature file has several entries in it:

1. Feature ID - The feature number assigned during compilation or digitization.

2. F Code - Five-digit code from the DMAFF.

3. Attribute Code - This is a unique three character alphanumeric code used to identify an attribute.

4. Attribute Values - A value can be either an actual value or a coded value. An example of an actual value would be a measurement such as a road width measurement. A coded value represents a range of values or some descriptive item such as the Soil Type Category (STC) of surface materials having the value "10" representing "CL - Inorganic clay."

VITD

Structure. VITD uses VPF as its data format. VPF data exist in two types of files, directories and tables. The data are organized into four layers; data base, library and coverage (all directories), and feature class (tables) (Figure 2).

VPF Data Layer	Example
Data base	Terrain Analysis Data Set
Library	ITD Cell
Coverage	Transportation
Feature Class	Transportation Feature Tables
	Transportation Primitive Tables

Figure 2. Example of VPF Data Structure

Directories. The directory structure is similar to the structure used by most software/computer systems, a "tree" structure. The "root" or base directory for VITD is the data base or simply the set of all VITD cells known collectively as the Terrain Analysis Data Set (TADS).

One level down in the hierarchy is the library, which is the VITD cell. A two-letter country code and a six-digit VITD cell code address each cell:

Format: CCXXXXXX
Example: USW64462

The subdirectories existing in the library directory are the coverage directories. In VITD, the six different thematic overlays are slope, soils, vegetation, surface drainage, obstacles and transportation.

Tables. The tables in VPF store the data. There are two types of tables, primitive and feature attributes. Both types have a similar three part construction: a header file to describe the content and format, record identifiers, and the main body of the table that contains the information.

Primitive tables maintain the coordinates and relationships that VPF uses to model features. Under VPF, these tables store information on four geometric and one cartographic primitives. The geometric primitives are entity nodes, which represent isolated point features such as off-route fords; connected nodes, which represent point features associated with a linear feature such as bridges and tunnels; edges, which represent linear features such as roads and streams; and faces, which represent area features like soils and vegetation cover. The cartographic primitive models text as a feature (e.g., "Appalachian Mountains").

The relationship between the primitives which are stored in the tables is known as topology. Topology is a mathematical procedure for defining spatial relationships. Knowledge of these spatial relationships allows a computer (or more specifically, a geographic information system) to conduct

complex analyses, such as CCM and road network analysis. Use of topology also is a more efficient way to store data.

The characteristics of features (length, width, depth, material composition, etc.) are stored in the feature attribute table. There are point, line, area, and text tables. These tables correspond to the entity node, edge, face, and text primitives, respectively. Feature classes are formed when a feature attribute table is related to a primitive table.

Feature Attribute Table Coding. Feature attribute table types used in VITD are determined by the geometry of the features contained within them. There are four types: area, line, point and node. With the exception of the node, features are characterized according to map specifications. Area features are those with sufficient dimensions in both directions for length and width to be depicted, such as a soil polygon or a large stream. For soils, surface configuration and vegetation, area features have to be at least 20 square millimeters (1,000 square meters ground distance) with a minimum of one millimeter (50 meters ground distance) in the shortest dimension. For surface drainage, area features must be at least two square millimeters (100 meters ground distance) with the shortest dimension being at least one millimeter. Features found on the line attribute table have length (generally greater than two millimeters), but are too narrow to be depicted as areas. A point feature would be too small to be portrayed as having length or width according to specifications. A node is a point feature which is located on a linear feature. Examples of a node would be a point bridge (located on a road), and a dam (located on a stream). Note: long bridges (greater than 100 meters ground distance) are represented as linear features and are not nodes.

Feature Attribute Table Entries. The entries of a feature table are similar to those found in the ITD feature file. Each feature table has several entries in it:

1. Feature ID - The feature number assigned during compilation or digitization.

2. FACC Code - This is a code from the FACC. It is a unique five-digit code. The first two digits categorize the feature, and the last three are for unique feature identification.

3. Attribute Code - This is a unique three-character alphanumeric code used to identify an attribute.

4. Attribute Values - A value can be either an actual value or a coded value. An example of an actual value would be a measurement, such as a road width measurement. A coded value represents a range of values or some descriptive item like the Soil Type (STP) of surface materials having the value "10" representing "CL - Inorganic clay, lean clay." In VITD, an actual value can also be a character string as with the Text Attribute (TXT).

The main difference is that VITD uses FACC instead of the DMAFF codes. Figure 3 summarizes the ITD and VITD coding components. A complete listing of feature codes, attribute codes, attributes, attribute values and meanings is included in Appendices D and E.

Component	Example
ITD	
Feature ID	197
F Code	1L160 (Pipe)
Attribute Code	LOC
Attribute Value	3 (On ground surface)
VITD	
Feature ID	197
FACC Code	AQ113 (Pipe/Pipeline)
Attribute Code	LOC (Location)
Attribute Value	8 (On ground surface)

Figure 3. Components of Coding

APPLICATIONS OF ITD/VITD

ITD and VITD can be used by a number of different systems. These include simulation systems such as the Combined Arms Tactical Trainer (CATT), exploitation systems such as the Digital Topographic Support System (DTSS), and the Army Battle Command System (ABCS). Simulation systems use the data to populate their data bases with road networks, vegetation, drainage, obstacles and soils. The other systems use the data to produce maps and to make Tactical Decision Aids (TDAs). TDAs are created by combining the information/attributes from different layers of data to make quick informed decisions.

TDAs Produced Using the DTSS. The TDAs that can be generated using the DTSS include:

1. Off/On Road Speed/Reason/Difference - Computes the speed and limiting factors for user-specified vehicles and weather conditions. Coverage(s) used: surface materials, surface configuration, vegetation, transportation.

2. Gap Crossing - Computes the span and swim capability for user-specified vehicles. Coverage(s) used: surface drainage.

3. Trafficability - Computes the number of passes that can be made through an area before it becomes impassable. Coverage(s) used: surface materials.

4. Surface Degradation - Computes the rut depth created by a vehicle for a user-specified number of passes. Coverage(s) used: surface materials.

5. Time Contours - Shows the time to reach certain points by displaying lines of equal time. Coverage(s) used: surface materials, surface configuration, vegetation, transportation.

6. Route Analysis - Predicts the best route between two user-specified points analyzing off-road and on-road speed predictions. Coverage(s) used: surface materials, surface configuration, vegetation, transportation.

7. Mobility Corridors - Depicts the best corridors analyzing off-road and on-road speed predictions, obstacles, size and width of a unit. Coverage(s) used: surface materials, surface configuration, vegetation, transportation, obstacles.

8. Proximity Analysis - Allows the user to find a feature or feature category within a certain distance of other features. This type of analysis is useful in determining Helicopter Landing Zones, Drop Zones, Bivouac Sites and Main Supply Routes. Coverages would be dependent upon the type of analysis.

9. Attribute Modeling - Allows the user to create a new product that emphasizes a certain feature or feature category. This is done by assigning weighted values to specified feature attributes in the data base and finding statistical breaks.

10. Data Query - While not a true TDA, this feature allows a user to create tailored products by selecting attributes in the data base.

TDAs Produced Using the Terrain Evaluation Module (TEM). Unlike the DTSS, which is a system using many different types of software, TEM is a software that resides on Army Battle Command System. Examples of the TDAs that can be created using TEM include:

1. Aerial Detection - Indicates distances at which incoming targets become visible to an observer on the ground. Coverage(s) used: surface configuration, vegetation.

2. Cover and Concealment - Predicts the probability of detection of a ground target by visual aerial surveillance based on vegetation type and canopy closure. Coverage(s) used: vegetation.

3. CCM - Predicts vehicle mobility and speed through an area of interest. Coverage(s) used: surface materials, surface configuration, vegetation.

4. Helicopter Landing Zones - Used to locate acceptable areas for helicopter landings. Coverage(s) used: surface configuration, vegetation.

5. Helicopter Approach - Indicates distance at which incoming helicopters can be sited, taking into account that the helicopter can hide from an observer's line-of-sight by hovering in depressions and against ground clutter backgrounds. Coverage(s) used: surface configuration, vegetation.

6. Helicopter Survivability - Determines safe engagement aviation routes to pop-up and fire positions. Coverage(s) used: surface configuration, vegetation.

7. Mobility Corridors - Uses the results of the mobility model to show passable terrain corridors for forces of each echelon. Coverage(s) used: surface materials, surface configuration, vegetation, transportation, obstacles.

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APPENDIX A

GENERAL INFORMATION ABOUT ITD/VITD

GENERAL INFORMATION ABOUT ITD/VITD

This appendix is intended to provide useful background information to the new ITD/VITD user. It is broken out by theme with some of the more difficult concepts addressed in each section.

SURFACE CONFIGURATION

Naturally and/or Culturally Dissected Land. A special case slope category. It represents a collection of individual slope categories covering the full range of slope, each of which is below the minimum collection size, but which collectively form an area large enough to be portrayed in this special category. The use of this category is strictly limited to those cases where it is the only way to properly represent a range of mixed slope categories in a small area. Its areal extent will normally cover a small fraction of the overlay.

Some geomorphic phenomena likely to display this type of surface include:

1. Numerous, very close, very steep sand dunes.
2. Portions of badlands areas.
3. Areas of very closely spaced mine tailings/spoil piles/mining waste.
4. Cuts from strip mining.
5. Large quarries.
6. Numerous sink holes in karst areas.
7. Recent and non-weathered lava flows.
8. Extremely dissected terrain with dense drainage patterns.
9. Steep-sloped canyons.
10. Knob and kettle; hummocky terrain.

Avenues of Approach. Narrow valleys and ridge tops present unique situations when creating slope. Contour lines do not always show valleys and ridge tops correctly, and they may be the only avenues of approach into an area.

Narrow Valleys. In situations where a narrow connection (e.g., < 20 millimeters (map scale)/1,000 meters (ground distance) in length, and between 1-2 millimeters/50-100 meters in width) exists between wider valley areas, the connection is portrayed as a continuous avenue of approach.

Ridge Tops. Continuous avenues of approach are shown on narrow ridge tops with the same dimensions as above.

SURFACE DRAINAGE

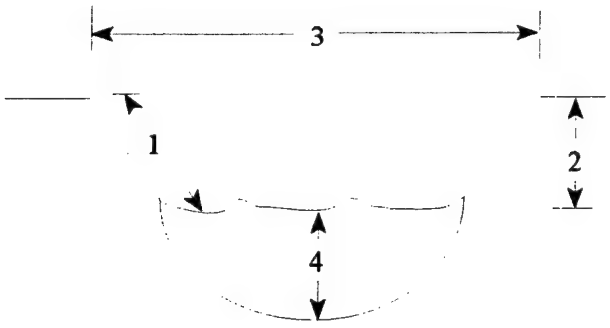

Figure 4. Typical Stream Measurements

Figure 4 depicts a cross-section of a generic stream channel. Typical stream measurements include:

1. Bank Gradient (Left or Right). Left or right side determined by facing in the direction of the flow. Attribute: BGL, BGR (ITD & VITD).

2. Bank Height (Left or Right). Left or right side determined by facing in the direction of the flow. Attribute: BHL, BHR (ITD & VITD).

3. Gap Width. Attribute: GWD (ITD), WD3 (VITD).

4. Average Water Depth. Attribute: WDA (ITD & VITD).

Earlier hard-copy products used ranges of values. ITD and VITD use default values instead of ranges of values. Generally these discrete values are the midpoint of the ranges.

SURFACE MATERIALS

Note: The information on the General Roughness Category is provided for informational purposes only. It was discontinued as an attribute as of December 1993.

GR Category. An attribute found in ITD specifications only. There are five different roughness categories, relating to vehicle types: GR1 - large and medium tanks; GR2 - large-wheeled vehicles; GR3 - small-wheeled vehicles; GR4 - small-tracked vehicles; and GR5 - foot troops. The categories are based on surface roughness factors. These roughness factors are a measure of speed degradation due to surface effects. The attribute is used for input into the DMA CCM model (Note: DMA CCM is no longer used by the U.S. Army). The values assigned to the roughness factors are subjective and assigned by analysts. In estimating the magnitude of the values, analysts consider the

physical characteristics of the surface, and the characteristics of the vehicles, such as climb ability, ground clearance, self-bridging capabilities, wheel sizes, and vehicle height, width and length.

Surface roughness causing no degradation of speed would have a factor value of 1.00. Surfaces preventing movement across them would have a value of 0.00. The value assigned to a surface roughness factor and the resulting speed degradation are an inverse relationship. For example, a surface roughness value of 0.80 would mean a 20 percent slower speed. A salt flat would be an example of an area with a value of 1.00. A dissected flood plain would have a low to medium value about 0.3 to 0.6. It is important to remember that roughness factors will vary according to vehicles. Tanks can cross a field quicker than foot troops, but foot troops have greater climb ability and are not stopped by as many vertical obstacles.

TRANSPORTATION

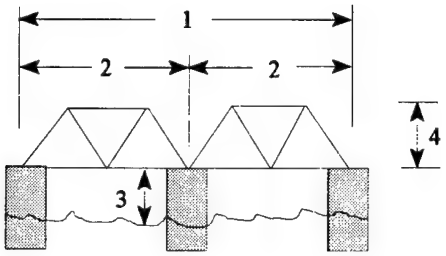

Figure 5. Typical Bridge Measurements

Figure 5 depicts a cross-section of a generic bridge. Typical bridge measurements include:

1. Overall Bridge Length. Attribute: LND (ITD), LEN (VITD), YLN (VITD - node feature).

2. Span Length. Attribute: LND (ITD), YLN (VITD).

3. Underbridge Clearance. Attribute: UBD (ITD), UBC (VITD).

4. Overhead Clearance. Attribute: OHD (ITD), OHC (VITD).

VEGETATION

Note: The information on the General Roughness Category is provided for informational purposes only. It was discontinued as an attribute as of December 1993.

GR Category. Like surface materials, the vegetation theme (for ITD only) contains the GR1 Category. But, rather than being based on surface roughness, it is based on vegetative effects.

Also, instead of five categories, vegetation roughness is only considered for one type of vehicle, large and medium tanks.

The value assigned to the vegetation roughness factor can vary widely with the type of ground cover. Grasses generally have high values near 0.90. Mangrove trees, whose roots protrude above ground level, have low values near 0.10. However, stem diameter and stem size are figured separately and are not used when considering the vegetation roughness.

When estimating vegetation roughness, ground effects are not considered. A swamp covered in grasses would have a high vegetative roughness factor, even though it would hinder vehicle movement. Analysts do consider the influences of fallen timber, stumps, and limited visibility caused by low-hanging branches, bushes and thick undergrowth.

Earlier hard-copy products used ranges of values. ITD and VITD use default values instead of ranges. Generally, these discrete values are the midpoint of the ranges.

APPENDIX B

FEATURE CODE GLOSSARY

FEATURE CODE GLOSSARY

Feature (ITD/VITD)	Description
Airfield/Runway (1U160/GB055)	A defined area, usually rectangular, used for the conventional landing and take-off of aircraft.
Bamboo/Cane (5C010/EC010)	Woody, tree-like grass.
Barren Ground (A010/DA020)	Land surface void of vegetation or other specific surface materials.
Bluff/Cliff/Escarpment (4B010/DB010)	A steep, vertical, or overhanging face of rock or earth.
Bridge/Overpass/ Viaduct (1Q040/AQ040)	A manmade structure spanning and providing passage over a body of water, road, railroad, depression, or other obstacle.
Bridge Span (1Q045/ -)	The section of a bridge located between two supports. The length of the span may not represent the distance between the supports depending on the width of the supports.
Built-up Area (1L020/AL020)	An area containing a concentration of buildings and structures.
Canal (2H020/BH020)	A manmade or improved natural waterway used for transportation, irrigation, or drainage control.
Cart Track (1P010/AP010)	A unimproved roadway.
Common Open Water (2A040/SA010)	An area containing any surface water that is flowing or free-standing, such as lakes, canals, rivers, etc.
Constriction/ Expansion (1Q058/AQ058)	A point where a passage way narrows or expands beyond its width.

FEATURE CODE GLOSSARY

Feature (ITD/VITD)	Description
Covered Drainage (2H010/SA060)	A natural watercourse or manmade waterway that is covered, preventing its observation or further classification.
Cropland (5A010/EA010)	An area that has been tilled for the planting of crops.
Crossing Point/Ramp (2B220/AL195)	An inclined plane usually manmade for moving between two different levels. (May be used for pipeline crossing point.)
Cut (4B070/DB070)	An excavation of the Earth's surface to provide passage for a road, railroad, canal, etc.
Dam (2I020/BI020)	A permanent barrier across a watercourse used to impound water or divert its flow.
Depression (4B080/DB080)	A low area surrounded by higher ground.
Disturbed Soil (- /SA020)	An area that has been so disturbed by human activity that no single soil type can be accurately identified. These areas may include built-up areas, strip mines, landfills, railroad yards, etc.
Dragon Teeth (1L060/AL060)	Regularly spaced concrete or metal barriers laid in single rows to prevent vehicle movement.
Drop Gate Road/Railroad (1Q068/ -)	A massive assemblage of material, usually in the form of concrete logs or blocks, positioned alongside or over a transportation route as a potential barrier to an advancing enemy ground force.
Embankment (4B090/DB090)	A raised solid fill linear mound of earth or other material.
Ferry Crossing (1Q070/AQ070)	A route in a body of water where a ferry crosses from one shoreline to another.

FEATURE CODE GLOSSARY

Feature (ITD/VITD)	Description
Ford (2H070/BH070)	A shallow place in a body of water used as a crossing.
Geographic Information Point (- /ZD012)	A location where geographic information or statistics may apply. (A feature of military significance and not captured by any other FACC code.)
Grassland (5B010/EB010)	An area composed of uncultured plants which have little or no woody tissue.
Ground Surface Element (4A010/DA010)	The surficial layer of consolidated and unconsolidated earth materials occurring on the land surface.
Gully/Gorge (2H140/DB200)	A long, narrow, deep channel with steep banks caused by flowing water.
Hedgerow (5A020/EA020)	A continuous growth of shrubbery planted as a fence, a boundary, or a wind break.
Island (2A030/BA030)	A land mass smaller than a continent and surrounded by water.
Lock (2I030/BI030)	An enclosure, with a pair of gates controlling the water level, used for raising or lowering vessels as they pass from one water level to another.
Marsh/Swamp (5D040/BH095)	A saturated area, at times covered by water, supporting vegetation that may include trees.
Miscellaneous Feature (9D010/ -)	Miscellaneous graphic feature.
Moat (2H100/BH100)	A trench, usually filled with water, designed to prevent vehicle or troop movement.
Not Evaluated (9D020/ -)	Void collection area.

FEATURE CODE GLOSSARY

Feature (ITD/VITD)	Description
Orchard/Plantation (5A040/EA040)	An area covered by systematic planting of trees which yield fruits, nuts, or other products.
Permanent Snowfield (2J100/SA040)	An area permanently covered by snow or ice that covers a land mass, such as glaciers or other large expanse of snow.
Pipeline/Pipe (1L160/AQ113)	A tube for the conveyance of liquids or gases.
Prepared Raft or Float Bridge Site (2H055/AQ111)	Site on a river or canal that has ramp, piling, and/or pier structures constructed on one or both shores to allow for suitable future crossing operations using float bridge or rafting equipment.
Railroad (1N010/AN010)	A rail or set of parallel rails on which a train or trolley runs. Numerous tracks, of the same gauge, on a single bed, shall be treated as a one line feature.
Railroad Passing Track (1N030/ -)	A stretch of railroad track(s) connected to the main track system by switch(es); used to allow one train to pass another.
Railroad Siding/ Railroad Spur (1N050/AN050)	A stretch of railroad track(s) connected to the main track system by switch(es); used for temporary storage and loading/unloading.
Railroad Yard/ Marshaling Yard (1N080/AN060)	A system of tracks within defined limits and associated features that provide for loading/unloading and assembling trains.
Rice Field (- /BH135)	An area periodically covered with water used for growing rice.
River/Stream (2H140/BH140)	A natural-flowing watercourse.
Road (1P030/AP030)	An open way maintained for vehicular use.

FEATURE CODE GLOSSARY

Feature (ITD/VITD)	Description
Road/Railroad Fill (4B120/ -)	An embankment, with a side slope gradient > 45%, of earth and/or rock at a constant or smoothly changing grade or level, constructed to provide a passageway for a transportation feature, such as a road or railroad.
Rock Outcrop/ Exposed Bedrock (4B160/SA030)	Areas having little (less than 10%) or no soil, containing bare rock or extrusive material (such as lava).
Scrub/Brush (5B020/EB020)	Low-growing woody plants.
Sharp Curve (Radius of Curvature) (1Q118/AQ118)	A curve which may cause transportation restrictions.
Slope Polygon (3A060/SA050)	An area enclosing a group of slope values falling within a set range.
Trees (5C030/EC030)	Woody-perennial plants having a self-supporting main stem or trunk.
Tunnel (1Q130/AQ130)	An underground or underwater passage, open at both ends, usually containing a road, railroad, canal, or aqueduct.
Vineyards (5A050/EA050)	An area covered by the systematic planting of grape vines. In this product, hops are represented in this category.
Volcanic Dike (2B070/DB190)	A steep ridge of igneous rock.
Wall/Fence (1L260/Al260)	A solid manmade barrier of heavy material used as an enclosure or boundary or for protection.
Wetlands/Land Subject to Inundation (2H090/BH090)	An area periodically covered by flood water, excluding tidal waters.

APPENDIX C

ATTRIBUTE GLOSSARY

ATTRIBUTE GLOSSARY

Note: Superscript[I] - ITD attribute only.
Superscript[V] - VITD attribute only.

Attribute	Description
Accuracy Category (ACC)	The relative accuracy of the geographic location.
Bypass Condition Category (BCC)	The ease or ability to circumvent a destroyed section of a bridge, tunnel or pass within a 2 kilometer distance on each side of the feature. Bypass condition will not consider other bridges in bypass determination.
Brush Land Density Category (BDC)[I]	A measure of the "thickness" of the brush or undergrowth in an area.
Bank Gradient Left (BGL)	Slope of the left bank above the water level (facing downstream).
Bank Gradient Right (BGR)	Slope of the right bank above the water level (facing downstream).
Bank Height Left (BHL)	Height of the left bank above the water level (facing downstream) to the average water level.
Bank Height Right (BHR)	Height of the right bank above the water level (facing downstream) to the average water level.
Bridge Reference Number (BRN)	A unique number relating information to bridge and bridge spans.
Brush/Undergrowth Density Code (BUD)[V]	A measure of the "thickness" of the brush or undergrowth in an area.
Bank Vegetation Left (BVL)[V]	Density of vegetation found on the left bank (facing downstream).
Bank Vegetation Right (BVR)[V]	Density of vegetation found on the right bank (facing downstream).

ATTRIBUTE GLOSSARY

Attribute	Description
Cumulative Track Length (CTL)[V]	Total cumulative length of track contained within the confines of the feature, exclusive of the main branch or main trunk lines running into and/or out of the feature.
Definition of Landing Area (DLA)[I]	Whether a runway is well defined or not.
Density Measure (% of Tree/Canopy Cover) (DMT)	Canopy cover measured by percent within area of feature during the summer season (leaves on condition).
Existence Category (EXS)	The state or condition of the feature.
Farming Type Category (FTC)[V]	Type of field pattern.
Feature Configuration (FCO)[V]	Configuration of the feature object(s).
General Roughness Category (GR 1-5)[I]	Used in estimating the roughness effect for surface materials and vegetation (GR1 only). The values correspond to vehicle types/classes: GR1 - Large and medium tanks GR2 - Large-wheeled vehicles GR3 - Small-wheeled vehicles GR4 - Small-tracked vehicles GR5 - Foot troops
Ground Slope Category (GSC)	Range indicating the slope of the ground within the delineated area of a feature, reported in percent.
Gap Width Decimeters (GWD)[I]	The gap width as described in the TTADB specifications.
Height Above Surface Level (HGT)	Distance measured from the lowest point of the base at ground or water level (downhill/downstream side) to the tallest point of the feature.

ATTRIBUTE GLOSSARY

Attribute	Description
Hydrographic Location Category (HLC)[I]	Describes location of obstacles with respect to the water surface.
Hydrological Category (HYC)	Identifies the annual water content of the feature.
Load Class Type (LC 1-4)[I]	The amount of tonnage a structure can support based on vehicle type.
Length/Diameter (LEN)	A measurement of the longer of two linear axes. For a square feature, measure either axis. For a round feature, measure the diameter.
Length in Decimeter (LND)[I]	The length of a feature in decimeters.
Location Category (LOC)	Placement relative to ground surface, water surface, or shoreline.
Lane/Track Characteristics (LTC)[I]	Indicates whether a road or track is single or multiple.
Material Composition Category (MCC)	Composition material, excluding surface material.
Number of Spans (NOS)	The number of spans in a bridge.
Overhead Clearance Category (OHD)[I], (OHC)[V]	The least distance between the traveled way and any obstruction vertically above it.
Overlay Category (OVC)[I]	Denotes which thematic overlay a feature belongs to.

ATTRIBUTE GLOSSARY

Attribute	Description
Predominant Height (PHT)[V]	Height of at least 51% of the feature. If not obtainable, then the average height of the feature will be used.
Railroad Power Source (RRA)	Source of power for locomotion.
Railroad Categories (RRC)	The type of railroad system used to support various transportation uses.
Railroad Spur/Siding Attribute (RSA)[V]	Type of connecting track.
Road/Railroad Structure Category (RSC)[I]	Denotes if a road or railroad is elevated.
Road/Runway Surface Type (RST)	Physical surface composition of the feature.
Stream Bank Vegetation (SBV)[I]	Specifies vegetation and stream bank.
Soil Depth Category (SDC)	Estimated general depth of soil or unconsolidated surface material.
Stem Diameter Size (SDS)	The average stem diameter size in a stand, measured at a height of 1.4 meters above the ground.
Gradient/Slope (SGC)	The percentage of slope.
Surface Roughness Description (SRQ)[I], (SRD)[V]	A code that describes the condition of the surface material that may be used for mobility predictions, construction material, and landing sites.

ATTRIBUTE GLOSSARY

Attribute	Description
Soil Type Condition (STC)[I], (STP)[V]	Soil categories described by the Unified Soil Classification System (USCS).
Soil Wetness Condition (SWC)	General moisture content or condition of the soil.
Tidal/ Non-tidal Category (TID)[V]	Identifies whether a feature is affected by tidal waters.
Tree Spacing Category (TSD)[I], (TSC)[V]	The average distance from the center of one tree to the center of the nearest tree in a stand.
Transportation Use Category (TUC)	Identifies the primary user, function, or authority of the transportation system.
Travelway Characteristics (TWC)[I]	Indicates if a roadway is divided.
Text Attribute (TXT)[V]	Narrative or other description.
Underbridge Clearance Category (UBD)[I], (UBC)[V]	Clearance below a bridge, measured from the lowest surface level to the base of the lower of either a crossbeam or the lowest bridge deck.
Usage (USE)[V]	Use.
Vegetation Characteristics (VEG)	Type of plant or plantings.
Water Depth Average (WDA)	The average water depth.
Width (WDD)[I], (WID)[V]	A measure of the shorter of two linear axes on the horizontal plane. For a square feature, measure either axis.

ATTRIBUTE GLOSSARY

Attribute	Description
Minimum Traveled Way Width (WD1)[V]	Minimum width of the traveled way, excluding pavements and hard shoulders.
Military Gap Width (WD3)[V]	The minimum horizontal bridging distance between banks.
Width Top (WD5)[V]	The width at the top of the feature.
Weather Type Category (WTC)	Weather conditions under which a feature is usable.
Water Velocity Average (WVA)	Average velocity of the stream.
Length of Greater Precision (YLN)[V]	A measurement of the longer of two linear axes capable of being expressed in decimal meter units.

APPENDIX D

DMAFF FEATURE CODES/ATTRIBUTES FOR ITD

DMAFF FEATURE CODES/ATTRIBUTES FOR ITD

Note: All features have the Overlay Category (OVC) attribute associated with them. This attribute has the following values and meanings:

0 Unknown

1 Surface Configuration

2 Vegetation

3 Surface Materials

4 Surface Drainage

5 Transportation

6 Obstacles

OBSTACLES

DMAFF CODE	FEATURE	F TYPE	ATT. CODE	ATTRIBUTE	ATT. VALUE	VALUE MEANING
1L060	Dragon Teeth	A, L	N/A	N/A	N/A	N/A
1L160	Pipeline	L	LOC	Location/Origin Code	0 3 4	Unknown On Ground Surface Suspended or elevated
1L260	Wall/Fence	L	N/A	N/A	N/A	N/A
2B070	Volcanic Dike	L	MCC	Material Composition Category	94	Volcanic
2B220	Crossing Point (Ramp)	P	HLC	Hydrographic Location Category	19	Above surface
2H100	Moat	L	N/A	N/A	N/A	N/A
4B010	Bluff/Cliff/ Escarpment	L	N/A	N/A	N/A	N/A
4B070	Road/Railroad Cut	L	N/A	N/A	N/A	N/A
4B080	Depression	L	N/A	N/A	N/A	N/A
4B090	Embankment	L	N/A	N/A	N/A	N/A
4B120	Road/Railroad Fill	L	N/A	N/A	N/A	N/A
5A020	Hedgerow	L	N/A	N/A	N/A	N/A
9D010	Miscellaneous Obstacle	A, L, P	N/A	N/A	N/A	N/A

DMAFF FEATURE CODES/ATTRIBUTES FOR ITD

SURFACE CONFIGURATION						
DMAFF CODE	**FEATURE**	**F TYPE**	**ATT. CODE**	**ATTRIBUTE**	**ATT. VALUE**	**VALUE MEANING**
2A040	Open Water	A	N/A	N/A	N/A	N/A
3A060	Slope	A	GSC	Ground Slope Category	0	Unknown
					1	Naturally or culturally dissected land
					2	0 to ≤ 3%
					3	> 3 to ≤ 10%
					4	> 10 to ≤ 20%
					5	> 20 to ≤ 30%
					6	> 30 to ≤ 45%
					7	> 45%
9D010	Miscellaneous Obstacle	A, L, P	N/A	N/A	N/A	N/A

DMAFF FEATURE CODES/ATTRIBUTES FOR ITD

SURFACE DRAINAGE						
DMAFF CODE	**FEATURE**	**F TYPE**	**ATT. CODE**	**ATTRIBUTE**	**ATT. VALUE**	**VALUE MEANING**
2A030	Island	A	N/A	N/A	N/A	N/A
2A040	Open Water	A	N/A	N/A	N/A	N/A
2H010	Covered Drainage (Aqueduct)	L	ACC	Accuracy Category	0	Unknown
					1	Accurate
					2	Approximate
			LOC	Location/Origin Category	0	Unknown
					1	Below Ground Level
2H020	Canal/Channelized Stream/Irrigation Canal/Drainage Ditch	A, L	BGL	Bank Gradient Left	0	Unknown
					1 to 998	Actual values (% slope)
						Default values for ranges:
					12	0 to < 30%
					38	≥ 30 to < 45%
					52	≥ 45 to < 60%
					80	≥ 60%
			BGR	Bank Gradient Right		Same as BGL.
			BHL	Bank Height Left	0	Unknown
					1 to 9998	Actual values (decimeters)
						Default values for ranges:
					2	≤ 5 dm
					8	> 5 to ≤ 10 dm
					30	> 10 to ≤ 50 dm
					75	> 50 dm

DMAFF FEATURE CODES/ATTRIBUTES FOR ITD

SURFACE DRAINAGE						
DMAFF CODE	**FEATURE**	**F TYPE**	**ATT. CODE**	**ATTRIBUTE**	**ATT. VALUE**	**VALUE MEANING**
2H020			BHR	Bank Height Right		Same as BHL
			GWD	Gap Width		**Line features:**
					0	Unknown
					1 to 180	Actual values (decimeters)
						Default values for ranges:
					20	≤ 45 dm
					113	> 45 to ≤ 180 dm
						Area features:
					181 to 99998	Actual values (decimeters)
						Default values for ranges:
					340	> 180 to ≤ 500 dm
					750	> 500 to ≤ 1000 dm
					1210	> 1000 to ≤ 1420 dm
					1710	> 1420 dm
			MCC	Material Composition Category	0	Unknown
					5	Bedrock
					14	Clay
					35	Gravel
					57	Paved
					66	Rock, Rocky
					69	Sand
					76	Silt

DMAFF FEATURE CODES/ATTRIBUTES FOR ITD

SURFACE DRAINAGE						
DMAFF CODE	**FEATURE**	**F TYPE**	**ATT. CODE**	**ATTRIBUTE**	**ATT. VALUE**	**VALUE MEANING**
2H020			RRC	Railroad/Road Drainage Category	0	Unknown
					4	Narrow Gauge
					7	Medium Gauge
					9	Wide Gauge
			SBV	Stream Bank Vegetation	0	Unknown
					1	Dense vegetation on the right bank
					2	Dense vegetation on the left bank
					3	Dense vegetation on both banks
					4	Neither bank contains dense vegetation
			WDA	Water Depth Average	0	Unknown
					1	≤ 0.8 meters
					2	> 0.8 - 1.6 meters
					3	> 1.6 - 2.4 meters
					4	> 2.4 meters
					5	≤ 1.2 meters
					6	> 1.2 - 2.4 meters
			WVA	Water Velocity Average	0	Unknown
					1	≤ 1.5 meters/second
					2	> 1.5 meters/second
2H055	Float Bridge/Raft Site	L, P	N/A	N/A	N/A	N/A
2H070	Off Route Ford	L, P	N/A	N/A	N/A	N/A

DMAFF FEATURE CODES/ATTRIBUTES FOR ITD

SURFACE DRAINAGE						
DMAFF CODE	**FEATURE**	**F TYPE**	**ATT. CODE**	**ATTRIBUTE**	**ATT. VALUE**	**VALUE MEANING**
2H140	River/Stream	A, L	BGL	Bank Gradient Left		See values and meanings under 2H020.
			BGR	Bank Gradient Right		
			BHL	Bank Height Left		
			BHR	Bank Height Right		
			GWD	Gap Width		
			HYC	Hydrological Category	0	Unknown
					6	Non-perennial/intermittent/ fluctuating
					8	Perennial/permanent
					10	Tidal/Tidal fluctuation
					11	Steep sides
					14	Braided
			MCC	Material Composition Category		See values and meanings under 2H020.
			SBV	Stream Bank Vegetation		
			RRC	Railroad/Road Category		
			WDA	Water Depth Average		
			WVA	Water Velocity		

DMAFF FEATURE CODES/ATTRIBUTES FOR ITD

SURFACE DRAINAGE						
DMAFF CODE	**FEATURE**	**F TYPE**	**ATT. CODE**	**ATTRIBUTE**	**ATT. VALUE**	**VALUE MEANING**
21020	Dam	L, P	EXS	Existence Category	0	Unknown
					1	Definite
					5	Under construction
			HGT	Height of Feature	0	Unknown
					3	Default value if dam < 5 meters
					≥ 5 to 998	Actual values (meters)
			LEN	Length/Diameter of Feature (Captured only if HGT > 5 m)	0	Unknown
					1 to ≤ 99	Actual values (meters) for point features.
					100 to 99998	Actual values (meters) for line features.
			MCC	Material Composition Category	0	Unknown
					18	Concrete
					23	Earthen work
					86	Stone
			WID	Width (Captured only if HGT > 5 m)	0	Unknown
					1 to 100	Actual values (meters)
21030	Lock	L, P	EXS	Existence Category	0	Unknown
					1	Definite
					5	Under construction
			LEN	Length/Diameter of Feature	0	Unknown
					1 to 99998	Actual values (meters)

DMAFF FEATURE CODES/ATTRIBUTES FOR ITD

SURFACE DRAINAGE						
DMAFF CODE	**FEATURE**	**F TYPE**	**ATT. CODE**	**ATTRIBUTE**	**ATT. VALUE**	**VALUE MEANING**
2I030			WID	Width	0 1 to 100	Unknown Actual values (meters)
9D010	Miscellaneous Drainage	A, L, P	N/A	N/A	N/A	N/A

DMAFF FEATURE CODES/ATTRIBUTES FOR ITD

SURFACE MATERIALS						
DMAFF CODE	**FEATURE**	**F TYPE**	**ATT. CODE**	**ATTRIBUTE**	**ATT. VALUE**	**VALUE MEANING**
2A040	Common Open Water	A	N/A	N/A	N/A	N/A
2J100	Permanent Snowfield	A	GR1-5	General Roughness Category	0	Unknown
					1	0.00
					2	0.05
					.	Increase each value by 0.05
					.	
					.	1.00
					21	
			SRQ	Surface Roughness Qualifier	0	Unknown
					1	No surface roughness effect
					2	Area of high landslide potential
					3-98	Unique descriptions tailored to individual project areas
4A010	Ground Surface	A	GR1-5	General Roughness Category		See values under 2J100.
			MCC	Material Composition Category	24	Evaporites
					77	Soil
			SDC	Soil Depth Category	0	Unknown
					1	< 0.5 meter
					2	≥ 0.5 meter
			SRQ	Surface Roughness Qualifier		See values under 2J100.
			STC	Soil Type Category	0	Unknown
					1	GW - Well graded gravels, gravel-sand mixtures, little or no fines.

DMAFF FEATURE CODES/ATTRIBUTES FOR ITD

SURFACE MATERIALS						
DMAFF CODE	**FEATURE**	**F TYPE**	**ATT. CODE**	**ATTRIBUTE**	**ATT. VALUE**	**VALUE MEANING**
4A010					2	GP - Poorly graded gravels or gravel-sand mixtures, little or no fines.
					3	GM - Silty gravels, gravel-sand-silt mixtures.
					4	GC - Clayey gravels, gravel-sand-clay mixtures.
					5	SW - Well-graded sand, gravelly sands, little or no fines.
					6	SP - Poorly graded sands or gravelly sands, little or no fines.
					7	SM - Silty sands, sand-silt mixtures.
					8	SC - Clayey sands, sand-clay mixtures.
					9	ML - Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.
					10	CL - Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
					11	OL - Organic silts and organic silty clays of low plasticity.
					12	CH - Inorganic clays of high plasticity, fat clays
					13	MH - Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
					14	OH - Organic clays of medium to high plasticity, organic silts.
					15	PT - Peat and other highly organic soils.

DMAFF FEATURE CODES/ATTRIBUTES FOR ITD

SURFACE MATERIALS						
DMAFF CODE	**FEATURE**	**F TYPE**	**ATT. CODE**	**ATTRIBUTE**	**ATT. VALUE**	**VALUE MEANING**
4A010			SWC	Soil Wetness Category	0	Unknown
					1	Dry
					2	Moist
					3	Wet
4B160	Rock Outcrop	A	SRQ	Surface Roughness Qualifier		See values and meanings under 2J100.
			GR1-5	General Roughness		
9D010	Miscellaneous Soil	A	N/A	N/A	N/A	N/A
9D020	Not Evaluated	A	N/A	N/A	N/A	N/A

DMAFF FEATURE CODES/ATTRIBUTES FOR ITD

TRANSPORTATION						
DMAFF CODE	**FEATURE**	**F TYPE**	**ATT. CODE**	**ATTRIBUTE**	**ATT. VALUE**	**VALUE MEANING**
1N010	Railroad Tracks	L	EXS	Existence Category	0	Unknown
					1	Definite
					5	Under Construction
					8	Dismantled
			LTC	Lane/Track Characteristics	0	Unknown
					3	Multiple
					4	Single
			RRA	Railroad Attributes	0	Unknown
					1	Electrified
					5	Non-electrified
			RRC	Road/Railroad Categories	0	Unknown
					1	Broad gauge
					4	Narrow/narrow gauge
					5	Normal (standard) gauge
1N030	Passing Track	L, P	EXS	Existence Category		See values and meanings under 1N010.
			LTC	Lane/Track Characteristics	0	Unknown
					280-20000	Actual value (meters)
			LEN	Length		See values and meanings under 1N010.
			RRA	Railroad Attributes		
			RRC	Road/Railroad Categories		

DMAFF FEATURE CODES/ATTRIBUTES FOR ITD

TRANSPORTATION						
DMAFF CODE	**FEATURE**	**F TYPE**	**ATT. CODE**	**ATTRIBUTE**	**ATT. VALUE**	**VALUE MEANING**
1N050	Siding Track	L, P	EXS	Existence Category		See values and meanings under 1N010.
			LTC	Lane/Track Characteristics	4	Single
			LEN	Length		See values and meanings under 1N010.
			RRA	Railroad Attributes		
			RRC	Road/Railroad Categories		
1N080	Rail Yard	A, L, P	EXS	Existence Category		See values and meanings under 1N010.
			LEN	Length/Diameter of Feature	0	Unknown
					0-99998	Actual values (meters)
			RRA	Railroad Attributes		See values and meanings under 1N010.
			RRC	Road/Railroad Categories		
1P010	Cart Track	L	ACC	Accuracy Category	0	Unknown
					1	Accurate
					2	Approximate

DMAFF FEATURE CODES/ATTRIBUTES FOR ITD

TRANSPORTATION						
DMAFF CODE	**FEATURE**	**F TYPE**	**ATT. CODE**	**ATTRIBUTE**	**ATT. VALUE**	**VALUE MEANING**
1P030	Road	L	ACC	Accuracy Category		See values and meanings under 1P010.
			EXS	Existence Category		See values and meanings under 1N010.
			RSC	Road/Railroad Structure Category	0	Unknown
					1	Non-elevated
					6	Elevated on structure
			RST	Road/Runway Surface Type	0	Unknown
					1	Hard/paved
					2	Loose/unpaved
			SGC	Slope/Gradient Category	0	Unknown
					1	0 - 2%
					2-98	Actual values (percent)
						Default values for ranges:
					3	< 7%
					8	> 7%
			TWC	Travelway Characteristics	0	Unknown
					1	Travelway for dual/divided same widths
					2	Travelway for dual/divided different widths
					3	Non-divided

DMAFF FEATURE CODES/ATTRIBUTES FOR ITD

TRANSPORTATION						
DMAFF CODE	**FEATURE**	**F TYPE**	**ATT. CODE**	**ATTRIBUTE**	**ATT. VALUE**	**VALUE MEANING**
1P130			WDD	Width	0	Unknown
					1-500	Actual values (decimeters)
			WTC	Weather Type Category	0	Unknown
					1	All weather
					2	Fair/dry weather
1Q040	Bridge	L, P	BCC	Bypass Condition Category	0	Unknown
					1	Difficult
					2	Easy
					3	Impossible
			BRN	Bridge Reference Number	1-998	Bridge number
			EXS	Existence Category		See values and meanings under Bridge 1N010.
			LC1	Load Class Type 1 (one way wheeled)	0	Unknown
					1-200	Actual values (short tons)
			LC2	Load Class Type 2 (two way wheeled)	0	Unknown
					0-200	Actual values (short tons)
			LC3	Load Class Type 3 (one way tracked)	0	Unknown
					0-200	Actual values (short tons)
			LC4	Load Class Type 4 (two way tracked)	0	Unknown
					0-200	Actual values (short tons)

DMAFF FEATURE CODES/ATTRIBUTES FOR ITD

TRANSPORTATION						
DMAFF CODE	**FEATURE**	**F TYPE**	**ATT. CODE**	**ATTRIBUTE**	**ATT. VALUE**	**VALUE MEANING**
1Q040			LND	Length	0	Unknown
					1-999	Point features - actual value (decimeters)
					1000-99998	Line features - actual value (decimeters)
			NOS	Number of Spans	0	Unknown
					1-98	Actual number of spans
			OHD	Overhead Clearance	0	Unknown
					1-500	Actual values (decimeters)
					501	Unlimited
			TUC	Transportation Use Category	0	Unknown
					3	Railroad
					4	Road
			UBD	Underbridge Clearance	0	Unknown
					1-998	Actual values (decimeters)
			WDD	Width	0	Unknown
					1-500	Actual values (decimeters)
1Q045	Bridge Span	L, P	ACC	Accuracy Category		See values and meanings under 1P010.
			BRN	Bridge Reference Number		See values and meanings under 1Q040.
			LND	Length		

DMAFF FEATURE CODES/ATTRIBUTES FOR ITD

TRANSPORTATION						
DMAFF CODE	**FEATURE**	**F TYPE**	**ATT. CODE**	**ATTRIBUTE**	**ATT. VALUE**	**VALUE MEANING**
1Q045			MCC	Material Composition Category	0	Unknown
					18	Concrete
					48	Masonry
					60	Prestressed concrete
					65	Reinforced concrete
					83	Steel
					86	Stone
					97	Wood
1Q058	Constriction/ Expansion	P	WDD	Width	0	Unknown
					1-40	Actual values (decimeters)
1Q068	Drop Gate	P	TUC	Transportation Use Category	4	Road
1Q070	Ferry Crossing	L, P	ACC	Accuracy Category		See values and meanings under 1P010.
			TUC	Transportation Use Category		See values and meanings under 1Q040.
1Q118	Road Radius of Curvature	P				
1Q130	Tunnel	L, P	ACC	Accuracy Category		See values and meanings under 1P010.
			EXS	Existence Category		See values and meanings under 1N010.
			LEN	Length/Diameter of Feature	0	Unknown
					1-99	Point features - actual value (meters)
					100-42000	Line features - actual value (meters)

DMAFF FEATURE CODES/ATTRIBUTES FOR ITD

TRANSPORTATION						
DMAFF CODE	**FEATURE**	**F TYPE**	**ATT. CODE**	**ATTRIBUTE**	**ATT. VALUE**	**VALUE MEANING**
1Q130			OHD	Overhead Clearance Category	0	Unknown
					1-500	Actual values (decimeters)
			TUC	Transportation Use Category		See values and meanings under 1Q040
						For line features only:
			WDD	Width	0	Unknown
					1-500	Actual values (decimeters)
1U060	Runway	A, L	DLA	Definition of Landing Area	0	Unknown
					1	No well-defined runway
					2	Well-defined runway
			EXS	Existence Category	0	Unknown
					1	Definite
					5	Under Construction
					6	Abandoned/non-operational
			LEN	Length/Diameter of Feature	0	Unknown
					1-5000	Actual values (meters)
			RST	Road/Runway Surface Type		See values and meanings under 1P130.
			WID	Width		**For area features only:**
					0	Unknown
					1-300	Actual values (meters) for well defined runway (DLA = 2)
					1-5000	Actual values (meters) for landing area (DLA = 1)

DMAFF FEATURE CODES/ATTRIBUTES FOR ITD

TRANSPORTATION						
DMAFF CODE	**FEATURE**	**F TYPE**	**ATT. CODE**	**ATTRIBUTE**	**ATT. VALUE**	**VALUE MEANING**
2H070	Ford	L, P	N/A	N/A	N/A	N/A
9D010	Miscellaneous Transportation	A, L, P	N/A	N/A	N/A	N/A

DMAFF FEATURE CODES/ATTRIBUTES FOR ITD

VEGETATION						
DMAFF CODE	**FEATURE**	**F TYPE**	**ATT. CODE**	**ATTRIBUTE**	**ATT. VALUE**	**VALUE MEANING**
1L020	Built-up Area	A	N/A	N/A	N/A	N/A
2A040	Open Water	A	N/A	N/A	N/A	N/A
2H090	Wetlands	A	GR1	General Roughness Category	0	Unknown
					1	0.00
					2	0.05
					.	
					.	Increase each value by 0.05
					.	
					21	1.00
A010	Bare Ground	A	GR1	General Roughness Category	0-21	See values under 2H090.
			MCC	Material Composition Category	4	Bare/cleared
5A010	Crops	A	GR1	General Roughness Category	0-21	See values under 2H090.
			VEG	Vegetation Characteristics	0	Unknown
					1	Dry crops
					2	Shifting (cultivation/usage)
					3	Terraced
					4	Rice Paddy
					5	Agriculture with Scattered Trees
					8	Grassland
					9	Grassland with Scattered Trees and Scrub Growth
					13	Deciduous
					14	Evergreen
					15	Mixed
					17	Palm

DMAFF FEATURE CODES/ATTRIBUTES FOR ITD

VEGETATION						
DMAFF CODE	**FEATURE**	**F TYPE**	**ATT. CODE**	**ATTRIBUTE**	**ATT. VALUE**	**VALUE MEANING**
5A010					19	Mangrove
					24	Forest Clearing
5A040	Orchard/Plantation	A	DMT	Density Measure (% of Tree/Canopy Cover)	0	Unknown
					1 to 100	Actual values (percent)
						Default values for ranges:
					12	> 0 to ≤ 25%
					38	>25 to ≤ 50%
					62	> 50 to ≤ 75%
					88	> 75 to ≤ 100%
			GR1	General Roughness Category		See values and meanings under 2H090.
			HGT	Height of Feature above Ground Level	0	Unknown
					1-150	Actual values (meters)
						Default values for ranges:
					1	0 to ≤ 2 m
					4	> 2 to ≤ 5 m
					8	> 5 to ≤ 10 m
					12	> 10 to ≤ 15 m
					18	> 15 to ≤ 20 m
					22	> 20 to ≤ 25 m
					28	> 25 to ≤ 30 m
					32	> 30 to ≤ 35 m
					36	> 35 m

DMAFF FEATURE CODES/ATTRIBUTES FOR ITD

VEGETATION						
DMAFF CODE	**FEATURE**	**F TYPE**	**ATT. CODE**	**ATTRIBUTE**	**ATT. VALUE**	**VALUE MEANING**
5A040			SDS	Stem Diameter Size	0	Unknown
					1 to 900	Actual values (centimeters)
			TSD	Tree Spacing Category	0	Unknown
					1-500	Actual values (decimeters)
			UGD	Undergrowth Density Category	0	Unknown
					1	None to sparse
					2	Medium to dense
			VEG	Vegetation Characteristics		See values and meanings under 5A010.
5A050	Vineyard (hops also included)	A	GR1	General Roughness Category		See values and meanings under 2H090.
5B010	Grassland	A	GR1	General Roughness Category		See values and meanings under 2H090.
			VEG	Vegetation Characteristics		See values and meanings under 5A010.
5B020	Brushland/Scrub	A	BDC	Brushland Density Category	0	Unknown
					1	Open to medium spacing (0-50% coverage)
					2	Medium to dense spacing (50-100% coverage)
			GR1	General Roughness Category		See values and meanings under 2H090.
5C010	Bamboo/Wild Cane	A	GR1	General Roughness Category		See values and meanings under 2H090.

DMAFF FEATURE CODES/ATTRIBUTES FOR ITD

VEGETATION						
DMAFF CODE	**FEATURE**	**F TYPE**	**ATT. CODE**	**ATTRIBUTE**	**ATT. VALUE**	**VALUE MEANING**
5C030	Trees	A	DMT	Density Measure (% of Tree/Canopy Cover)		See values and meanings under 5A040.
			GR1	General Roughness Category		See values and meanings under 2H090.
			HGT	Height of Feature above Ground Level		See values and meanings under 5A040.
			SDS	Stem Diameter Size		
			TSD	Tree Spacing Category		
			UGD	Undergrowth Density Category		
			VEG	Vegetation Characteristics		See values and meanings under 5A040.
5D030	Marsh/Bog	A	GR1	General Roughness Category		See values and meanings under 2H090.
5D040	Swamp	A	DMT	Density Measure (% of Tree/Canopy Cover)		See values and meanings under 5A040.
			GR1	General Roughness Category		See values and meanings under 2H090.
			UGD	Undergrowth Density Category		See values and meanings under 5A040.
			VEG	Vegetation Characteristics		See values and meanings under 5A040.
9D010	Miscellaneous Vegetation	A	N/A	N/A	N/A	N/A

APPENDIX E

FACC FEATURE CODES/ATTRIBUTES FOR VITD

FACC FEATURE CODES/ATTRIBUTES FOR VITD

OBSTACLES						
FACC CODE	**FEATURE**	**F TYPE**	**ATT. CODE**	**ATTRIBUTE**	**ATT. VALUE**	**VALUE MEANING**
AL060	Dragon Teeth	A, L	N/A	N/A	N/A	N/A
AL195	Ramp	P	N/A	N/A	N/A	N/A
AL260	Wall	L	N/A	N/A	N/A	N/A
AQ113	Pipeline/Pipe	L	LOC	Location Code	0 8 25	Unknown On ground surface Suspended or elevated above ground or water surface
BH100	Moat	L	N/A	N/A	N/A	N/A
DB010	Bluff/Cliff/ Escarpment	L	N/A	N/A	N/A	N/A
DB070	Cut	L	N/A	N/A	N/A	N/A
DB080	Depression	A	N/A	N/A	N/A	N/A
DB090	Embankment/ Fill	L	USE	Usage	0 69 139	Unknown Dike/Levee Fill
DB190	Volcanic Dike	L	N/A	N/A	N/A	N/A
EA020	Hedgerow	L	N/A	N/A	N/A	N/A
ZD012	Geographic Information Point	A, L, P	TXT	Text Attribute	Char. String	Narrative or other description

FACC FEATURE CODES/ATTRIBUTES FOR VITD

SURFACE CONFIGURATION						
FACC CODE	**FEATURE**	**F TYPE**	**ATT. CODE**	**ATTRIBUTE**	**ATT. VALUE**	**VALUE MEANING**
SA010	Common Open Water	A	N/A	N/A	N/A	N/A
SA050	Slope Polygon	A	GSC	Ground Slope Category	0	Unknown
					1	Naturally or culturally dissected land
					2	0 to ≤ 3%
					3	> 3 to ≤ 10%
					4	> 10 to ≤ 20%
					5	> 20 to ≤ 30%
					6	> 30 to ≤ 45%
					7	> 45%
ZD012	Geographic Information Point	A, L, P	TXT	Text Attribute	Char. String	Narrative or other description

FACC FEATURE CODES/ATTRIBUTES FOR VITD

SURFACE DRAINAGE						
FACC CODE	**FEATURE**	**F TYPE**	**ATT. CODE**	**ATTRIBUTE**	**ATT. VALUE**	**VALUE MEANING**
AQ111	Prepared Raft or Float Bridge Site	L, N	N/A	N/A	N/A	N/A
BA030	Island	A	N/A	N/A	N/A	N/A
BH020	Canal	A, L	BGL	Bank Gradient Left	0	Unknown
					1 to 998	Actual values (percent slope)
						Default values for ranges:
					12	0 to < 30%
					38	≥ 30 to < 45%
					52	≥ 45 to < 60%
					80	≥ 60%
			BGR	Bank Gradient Right		Same as BGL
			BHL	Bank Height Left	0	Unknown
					1 to 9999	Actual values (decimeters)
						Default values for ranges:
					2	≤ 5 dm
					8	> 5 to ≤ 10 dm
					30	> 10 to ≤ 50 dm
					75	> 50 dm
			BHR	Bank Height Right		Same as BHL
			BVL	Bank Vegetation Left	0	Unknown
					2	Sparse (> 5 to ≤ 15%)
					4	Dense (< 50%)

FACC FEATURE CODES/ATTRIBUTES FOR VITD

SURFACE DRAINAGE						
FACC CODE	**FEATURE**	**F TYPE**	**ATT. CODE**	**ATTRIBUTE**	**ATT. VALUE**	**VALUE MEANING**
BH020			BVR	Bank Vegetation Right		Same as BVL.
			MCC	Material Composition Category	0	Unknown
					5	Asphalt (= paved)
					7	Bedrock
					16	Clay (= clay and silt)
					46	Gravel (= gravel and cobble)
					84	Rock/Rocky (= rock and boulders)
					88	Sand (= sand and gravel)
					99	Silt (= silty sands)
			WD3	Military Gap Width	0	Unknown
					0 to 180	Actual values (decimeters) for line features.
						Default values for ranges (line):
					20	≤ 45 dm
					113	> 45 dm to ≤ 180 dm
					181 to 50000	Actual values (decimeters) for area features.
						Default values for ranges (area):
					340	> 180 dm to ≤ 500 dm
					750	> 500 dm to ≤ 1000 dm
					1210	> 1000 dm to ≤ 1420 dm
					1710	> 1420 dm

FACC FEATURE CODES/ATTRIBUTES FOR VITD

SURFACE DRAINAGE						
FACC CODE	**FEATURE**	**F TYPE**	**ATT. CODE**	**ATTRIBUTE**	**ATT. VALUE**	**VALUE MEANING**
BH020			WDA	Water Depth Average	0	Unknown
					1	≤ 0.8 m
					2	> 0.8 m to ≤ 1.6 m
					3	> 1.6 m to ≤ 2.4 m
					4	> 2.4 m
			WVA	Water Velocity Average	0	Unknown
					1	< 1.5 m/s
					2	> 1.5 m/s
BH070	Ford	L, N	N/A	N/A	N/A	N/A
BH140	River/Stream	A, L	BGL	Bank Gradient Left		See values and meanings under BH020.
			BGR	Bank Gradient Right		
			BHL	Bank Height Left		
			BHR	Bank Height Right		
			BVL	Bank Vegetation Left		
			BVR	Bank Vegetation Right		
			HYC	Hydrological Category		
			MCC	Material Composition Category		

FACC FEATURE CODES/ATTRIBUTES FOR VITD

SURFACE DRAINAGE						
FACC CODE	**FEATURE**	**F TYPE**	**ATT. CODE**	**ATTRIBUTE**	**ATT. VALUE**	**VALUE MEANING**
BH140			TID	Tidal/ Non-tidal Category	0	Unknown
					6	Non-perennial/intermittent/ fluctuating
					8	Perennial/permanent
					14	Braided
			WD3	Military Gap Width		See values and meanings under BH020.
			WDA	Water Depth Average	0	Unknown
					2	Tidal/tidal fluctuating
			WVA	Water Velocity Average		See values and meanings under BH020.
BI020	Dam	L, N, P	EXS	Existence Category	0	Unknown
					1	Definite
					5	Under construction
			HGT	Height Above Surface Level	0	Unknown
					3	< 5 m
					≥ 5 to 998	Actual values (meters)
			LEN	Length	0	Unknown
					0 to ≤ 99	Actual values (meters) for point features. Captured only if HGT > 5 m.
					≥ 100 to < 99998	Actual values (meters) for line features. Captured only if HGT > 5 m.

FACC FEATURE CODES/ATTRIBUTES FOR VITD

SURFACE DRAINAGE						
FACC CODE	**FEATURE**	**F TYPE**	**ATT. CODE**	**ATTRIBUTE**	**ATT. VALUE**	**VALUE MEANING**
BI020			MCC	Material Composition Category (Captured only if HGT > 5 m)	0	Unknown
					21	Concrete
					30	Earthen
					108	Stone
			WD5	Width - Top (Captured only if HGT > 5 m)	0	Unknown
					> 0 to < 100	Actual values (meters)
BI030	Lock	L, N	EXS	Existence Category	0	Unknown
					1	Definite
					5	Under construction
			LEN	Length	0	Unknown
					> 0 to ≤ 99	Actual values (meters) for point features.
					> 100 to < 998	Actual values (meters) for line features.
			WID	Width	0	Unknown
					> 0 to < 100	Actual values (meters)
DB200	Gully/Gorge	A, L	BGL	Bank Gradient Left		See values and meanings under BH020.
			BGR	Bank Gradient Right		
			BHL	Bank Height Left		
			BHR	Bank Height Right		
			BVL	Bank Vegetation Left		

FACC FEATURE CODES/ATTRIBUTES FOR VITD

SURFACE DRAINAGE						
FACC CODE	**FEATURE**	**F TYPE**	**ATT. CODE**	**ATTRIBUTE**	**ATT. VALUE**	**VALUE MEANING**
DB200			BVR	Bank Vegetation Right		See values and meanings under BH020.
			MCC	Material Composition Category		
			WD3	Military Gap Width		
			WDA	Water Depth Average		
			WVA	Water Velocity Average		
SA010	Common Open Water	A	N/A	N/A	N/A	N/A
SA060	Covered Drainage	L	ACC	Accuracy Category	0	Unknown
					1	Accurate
					2	Approximate
ZD012	Geographic Information Point	A, L, N	TXT	Test Attribute	Char. String	Narrative or other description

FACC FEATURE CODES/ATTRIBUTES FOR VITD

SURFACE MATERIALS						
FACC CODE	**FEATURE**	**F TYPE**	**ATT. CODE**	**ATTRIBUTE**	**ATT. VALUE**	**VALUE MEANING**
DA010	Ground Surface Element	A	SDC	Soil Depth Category	0	Unknown
					1	< 0.5 meter
					2	≥ 0.5 meter
			SRD	Surface Roughness Description	0	Unknown
					1	No surface roughness effect
					2	Area of high landslide potential
					11	Surface of numerous cobbles and boulders
					12	Areas of stony terrain
					13	Stony soil with surface rock
					14	Stony soil with scattered boulders
					15	Stony soil with numerous boulders
					16	Numerous boulders
					17	Numerous rock outcrops
					18	Area of scattered boulders
					19	Talus slope
					20	Boulder field
					31	Highly fractured surface rock
					32	Weathered lava flows
					33	Unweathered lava flows
					34	Stony soil with numerous rock outcrops
					35	Irregular surface with deep fractures of foliation
					36	Rugged terrain with numerous rock outcrops

FACC FEATURE CODES/ATTRIBUTES FOR VITD

SURFACE MATERIALS						
FACC CODE	**FEATURE**	**F TYPE**	**ATT. CODE**	**ATTRIBUTE**	**ATT. VALUE**	**VALUE MEANING**
DA010					37	Rugged bedrock surface
					38	Sand dunes
					39	Sand dunes/low
					40	Sand dunes/high
					41	Active sand dunes
					42	Stabilized sand dunes
					43	Highly distorted area, sharp, rocky ridges
					51	Stony soil cut by numerous gullies
					52	Moderately dissected terrain
					53	Moderately dissected terrain with scattered rock outcrops
					54	Dissected floodplain
					55	Highly dissected terrain
					56	Area with deep erosional gullies
					57	Steep, rugged, dissected terrain with narrow gullies
					58	Karst/areas of numerous sinkholes and solution valleys
					59	Karst/area of numerous sink holes
					60	Karst/hummocky terrain covered with large conical hills
					61	Karst/hummocky terrain covered with low, broad-based mounds
					62	Arroyo/wadi/wash
					63	Playa/dry lake
					64	Area of numerous meander scars and/or oxbow lakes

FACC FEATURE CODES/ATTRIBUTES FOR VITD

SURFACE MATERIALS						
FACC CODE	**FEATURE**	**F TYPE**	**ATT. CODE**	**ATTRIBUTE**	**ATT. VALUE**	**VALUE MEANING**
DA010					65	Solifluction lobes and frost scars
					66	Hummocky ground, areas of frost heaving
					67	Area of frost polygons
					68	Area containing sabkhas
					69	Area of numerous small lakes and ponds
					70	Area of numerous crevasses
					81	Area of numerous terraces
					82	Quarries
					83	Strip mines
					84	Quarry/gravel pit
					85	Quarry/sand pit
					86	Mine tailings/waste piles
					87	Salt evaporators
					88	Area of numerous dikes
					89	Area of numerous diked fields
					90	Area of numerous fields
					91	Area of numerous stone walls
					92	Area of numerous man-made canals/drains/ditches
					93	Area of numerous terraced fields
					94	Parallel earthen mounds (row crops)
					95	Area of numerous hedge rows

FACC FEATURE CODES/ATTRIBUTES FOR VITD

SURFACE MATERIALS						
FACC CODE	**FEATURE**	**F TYPE**	**ATT. CODE**	**ATTRIBUTE**	**ATT. VALUE**	**VALUE MEANING**
DA010			STP	Soil Type	0	Unknown
					1	GW - Well-graded gravel
					2	GP - Poorly graded gravel
					3	GM - Silty gravel
					4	GC - Clayey gravel
					5	SW - Well-graded sand/clay
					6	SP - Poorly graded sand
					7	SM - Silty sand
					8	SC - Clayey sand
					9	ML - Inorganic silt
					10	CL - Inorganic clay, lean clay
					11	OL - Organic silt
					12	CH - Fat clay
					13	MH - Inorganic silt
					14	OH - Organic clay
					15	PT - Peat
					17	ML-CL - Mixture
					18	EV - Evaporite
					999	Other
			SWC	Soil Wetness condition	0	Unknown
					1	Dry
					2	Moist
					3	Wet
					999	Other

FACC FEATURE CODES/ATTRIBUTES FOR VITD

SURFACE MATERIALS						
FACC CODE	**FEATURE**	**F TYPE**	**ATT. CODE**	**ATTRIBUTE**	**ATT. VALUE**	**VALUE MEANING**
SA010	Common Open Water	A	N/A	N/A	N/A	N/A
SA020	Disturbed Soil	A	N/A	N/A	N/A	N/A
SA030	Exposed Bedrock	A	SRD	Surface Roughness Description		See values and meanings under DA010.
SA040	Permanent Snowfield	A	SRD	Surface Roughness Description		See values and meanings under DA010.
ZD012	Geographic Information Point	A	TXT	Text Attribute	Char. String	Narrative or other description

FACC FEATURE CODES/ATTRIBUTES FOR VITD

TRANSPORTATION						
FACC CODE	**FEATURE**	**F TYPE**	**ATT. CODE**	**ATTRIBUTE**	**ATT. VALUE**	**VALUE MEANING**
AN010	Railroad	L	EXS	Existence Category	0	Unknown
					1	Definite
					5	Under Construction
					8	Dismantled
			FCO	Feature Configuration	0	Unknown
					2	Multiple
					3	Single
			RRA	Railroad Power Source	0	Unknown
					1	Electrified Track
					4	Non-electrified
			RRC	Railroad Categories	0	Unknown
					1	Broad gauge
					4	Narrow/narrow gauge
					5	Normal (standard) gauge
AN050	Railroad Siding/ Railroad Spur	L	EXS	Existence Category		See values and meaning under AN010.
			FCO	Feature Configuration	3	Single
			LEN	Length	0	Unknown
					> 280 to < 20000	Actual values (meters)
			RRA	Railroad Power Source		See values and meaning under AN010.
			RRC	Railroad Categories		

FACC FEATURE CODES/ATTRIBUTES FOR VITD

TRANSPORTATION						
FACC CODE	**FEATURE**	**F TYPE**	**ATT. CODE**	**ATTRIBUTE**	**ATT. VALUE**	**VALUE MEANING**
AN050			RSA	Railroad Spur/Siding Attribute	0	Unknown
					2	Siding
					3	Passing
AN060	Railroad Yard/ Marshalling Yard	A, L	CTL	Cumulative Track Length	0	Unknown
					> 0 to < 99998	Actual values (meters)
			EXS	Existence Category		See values and meaning under AN010.
			RRA	Railroad Power Source		
			RRC	Railroad Categories		
AP010	Cart Track	L	ACC	Accuracy Category	0	Unknown
					1	Accurate
					2	Approximate
AP030	Road	L	ACC	Accuracy Category		See values and meanings under AP010.
			EXS	Existence Category		See values and meaning under AN010.
			FCO	Feature Configuration	0	Unknown
					5	Divided, same widths
					6	Divided, different widths
					7	Non-divided

FACC FEATURE CODES/ATTRIBUTES FOR VITD

TRANSPORTATION						
FACC CODE	**FEATURE**	**F TYPE**	**ATT. CODE**	**ATTRIBUTE**	**ATT. VALUE**	**VALUE MEANING**
AP030			LOC	Location Category	0	Unknown
					8	On ground surface
					25	Suspended or elevated above ground or water surface
			RST	Road/Runway Surface Type	0	Unknown
					1	Hard/paved
					2	Loose/unpaved
			SGC	Gradient/Slope	0 to 98	Actual values (percent)
						Default values for ranges:
					3	< 7%
					8	≥ 7%
					999	Unknown
			WD1	Minimum Travelled Way Width	0	Unknown
					> 0 to 500	Actual values (decimeters)
			WTC	Weather Type Category	0	Unknown
					1	All weather
					2	Fair/dry weather
AQ040	Bridge/Overpass/ Viaduct	L, N	BCC	Bypass Condition Category	0	Unknown
					1	Easy
					2	Difficult
					3	Impossible

FACC FEATURE CODES/ATTRIBUTES FOR VITD

TRANSPORTATION						
FACC CODE	**FEATURE**	**F TYPE**	**ATT. CODE**	**ATTRIBUTE**	**ATT. VALUE**	**VALUE MEANING**
AQ040			BRN	Bridge Reference Number	0	Unknown
					> 0	Relates bridge to span
			EXS	Existence Category		See values and meaning under AN010.
			LC1	Load Class Type 1 (one way wheeled)	0	Unknown
					> 0 to ≤ 200	Actual values (short tons)
			LC2	Load Class Type 2 (two way wheeled)	0	Unknown
					> 0 to ≤ 200	Actual values (short tons)
			LC3	Load Class Type 3 (one way tracked)	0	Unknown
					> 0 to ≤ 200	Actual values (short tons)
			LC4	Load Class Type 4 (two way tracked)	0	Unknown
					> 0 to ≤ 200	Actual values (short tons)
			LEN	Length		**Used for a line feature only:**
					0	Unknown
					> 1000 to ≤ 9998	Actual values (meters)
			NOS	Number of Spans	0	Unknown
					> 0 to ≤ 98	Actual number of spans

FACC FEATURE CODES/ATTRIBUTES FOR VITD

TRANSPORTATION						
FACC CODE	**FEATURE**	**F TYPE**	**ATT. CODE**	**ATTRIBUTE**	**ATT. VALUE**	**VALUE MEANING**
AQ040			OHC	Overhead Clearance	0	Unknown
					> 0 to ≤ 500	Actual values (decimeters)
					501	Unlimited
			TUC	Transportation Use Category	0	Unknown
					3	Railroad
					4	Road
			UBC	Underbridge Clearance	0	Unknown
					> 0 to ≤ 998	Actual values (decimeters)
			WD1	Minimum Travelled Way Width	0	Unknown
					> 0 to ≤ 998	Actual values (decimeters)
			YLN	Length of Greater Precision		**For node feature only:**
					0	Unknown
					< 1000	Actual values (decimeters)
AQ045	Bridge Span	N	ACC	Accuracy Category	0	Unknown
					1	Accurate
					2	Approximate
			BRN	Bridge Reference Number	0	Unknown
					> 0	Relates bridge to span

FACC FEATURE CODES/ATTRIBUTES FOR VITD

TRANSPORTATION						
FACC CODE	**FEATURE**	**F TYPE**	**ATT. CODE**	**ATTRIBUTE**	**ATT. VALUE**	**VALUE MEANING**
AQ045			MCC	Material Composition Category	0	Unknown
					21	Concrete
					62	Masonry (brick/stone)
					77	Prestressed concrete
					83	Reinforced concrete
					107	Steel
					108	Stone
					117	Wood
			YLN	Length of Greater Precision	0	Unknown
					< 1000	Actual values (decimeters)
AQ058	Constriction/ Expansion	N	TUC	Transportation Use Category	0	Unknown
					3	Railroad
					4	Road
			WD1	Minimum Travelled Way Width	0	Unknown
					> 0 to ≤ 40	Actual values (decimeters)
AQ070	Ferry Crossing	L, N	ACC	Accuracy Category	0	Unknown
					1	Accurate
					2	Approximate
			TUC	Transportation Use Category	0	Unknown
					3	Railroad
					4	Road
AQ118	Sharp Curve	N	N/A	N/A	N/A	N/A

FACC FEATURE CODES/ATTRIBUTES FOR VITD

TRANSPORTATION						
FACC CODE	**FEATURE**	**F TYPE**	**ATT. CODE**	**ATTRIBUTE**	**ATT. VALUE**	**VALUE MEANING**
AQ130	Tunnel	L, N	ACC	Accuracy Category	0	Unknown
					1	Accurate
					2	Approximate
			EXS	Existence Category	0	Unknown
					1	Definite
					5	Under Construction
			LEN	Length	0	Unknown
					< 100	Actual values (meters) for point features.
					≥ 100 to 42000	Actual values (meters) for line features.
			OHC	Overhead Clearance Category	0	Unknown
					> 0 to ≤ 500	Actual values (decimeters)
			TUC	Transportation Use Category	0	Unknown
					3	Railroad
					4	Road
			WD1	Minimum Travelled Way Width	0	Unknown
					> 0 to ≤ 500	Actual values (decimeters)
BH070	Ford	L, N	N/A	N/A	N/A	N/A

FACC FEATURE CODES/ATTRIBUTES FOR VITD

TRANSPORTATION						
FACC CODE	**FEATURE**	**F TYPE**	**ATT. CODE**	**ATTRIBUTE**	**ATT. VALUE**	**VALUE MEANING**
GB055	Runway	A, L	EXS	Existence Category	0	Unknown
					1	Definite
					5	Under Construction
					6	Abandoned/disused
			LEN	Length	0	Unknown
					> 0 to < 5000	Actual values (meters) for line features.
					> 0 to < 50000	Actual values (meters) for area features.
			RST	Road/Runway Surface Type	0	Unknown
					1	Hard/paved
					2	Loose/unpaved
			WID	Width		**For area features only:**
					0	Unknown
					> 0 to < 300	Actual values (meters)
ZD012	Geographic Information Point	A, L, N, P	TXT	Text Attribute	Char. String	Narrative or other description.

FACC FEATURE CODES/ATTRIBUTES FOR VITD

VEGETATION						
FACC CODE	**FEATURE**	**F TYPE**	**ATT. CODE**	**ATTRIBUTE**	**ATT. VALUE**	**VALUE MEANING**
AL020	Built-up Area	A	N/A	N/A	N/A	N/A
BH090	Land Subject to Inundation	A	N/A	N/A	N/A	N/A
BH095	Marsh/Swamp	A	BUD	Brush/Undergrowth Density Code	0	Unknown
					2	Sparse (> 5 to ≤ 15%)
					4	Dense (> 50%)
			DMT	Density Measure (% of Tree/Canopy Cover)	999	Unknown
					0 to 100	Actual values (percent)
						Default values for ranges:
					12	> 0 to ≤ 25%
					38	> 25 to ≤ 50%
					62	> 50 to ≤ 75%
					88	> 75 to ≤ 100%
			VEG	Vegetation Characteristics	0	Unknown
					17	Palm
					19	Mangrove
					24	Deciduous
					25	Evergreen
					50	Mixed trees
					52	Forest clearing
					55	With trees
					56	Without trees
BH135	Rice Field	A	FTC	Farming Type Category	0	Unknown
					1	Shifting Cultivation
					3	Terraced

FACC FEATURE CODES/ATTRIBUTES FOR VITD

VEGETATION						
FACC CODE	**FEATURE**	**F TYPE**	**ATT. CODE**	**ATTRIBUTE**	**ATT. VALUE**	**VALUE MEANING**
DA020	Barren Ground	A	N/A	N/A	N/A	N/A
EA010	Cropland	A	FTC	Farming Type Category		See values and meanings under BH135.
			VEG	Vegetation Characteristics	0	Unknown
					1	Dry crops
EA040	Orchard/Plantation	A	BUD	Brush/Undergrowth Density Code		See values and meanings under BH095.
			DMT	Density Measure		
			PHT	Predominant Height	0	Unknown
					0 to 150	Actual values (meters)
						Default values for ranges:
					1	0 to ≤ 2 m
					4	> 2 to ≤ 5 m
					8	> 5 to ≤ 10 m
					12	> 10 to ≤ 15 m
					18	> 15 to ≤ 20 m
					22	> 20 to ≤ 25 m
					28	> 25 to ≤ 30 m
					32	> 30 to ≤ 35 m
					38	> 35 m

FACC FEATURE CODES/ATTRIBUTES FOR VITD

VEGETATION						
FACC CODE	**FEATURE**	**F TYPE**	**ATT. CODE**	**ATTRIBUTE**	**ATT. VALUE**	**VALUE MEANING**
EA040			SDS	Stem Diameter Size	0	Unknown
					> 0 to ≤ 900	Actual values (centimeters)
			TSC	Tree Spacing Category	0	Unknown
					> 0 to ≤ 500	Actual values (decimeters)
			VEG	Vegetation Characteristics		See values and meanings under BH095.
EA050	Vineyard (hops also included)	A	N/A	N/A	N/A	N/A
EB010	Grassland	A	VEG	Vegetation Characteristics	8	Pasture, meadow, steppe
					9	Grassland with scattered trees
EB020	Scrub/Brush	A	VEG	Vegetation Characteristics	53	Brushland open to medium spacing
					54	Brushland medium to dense spacing
EC010	Bamboo/Cane	A	N/A	N/A	N/A	N/A
EC030	Trees	A	BUD	Brush/Undergrowth Density Code		See values and meanings under BH095.
			DMT	Density Measure		
EC030			PHT	Predominant Height		See values and meanings under EA040.
			SDS	Stem Diameter Size		
			TSC	Tree Spacing Category		
			VEG	Vegetation Characteristics		See values and meanings under BH095
SA010	Common Open Water	A	N/A	N/A	N/A	N/A

FACC FEATURE CODES/ATTRIBUTES FOR VITD

VEGETATION						
FACC CODE	**FEATURE**	**F TYPE**	**ATT. CODE**	**ATTRIBUTE**	**ATT. VALUE**	**VALUE MEANING**
ZD012	Geographic Information Point	A	TXT	Text Attribute	Char. String	Text or other narrative description.